

## **REMARKS**

Claims 1, 2, 4-6, 11-16, 21, 31, 32, 38-58 and 60-65 are pending herein. Claims 6, 11, 16, 21, 38-41 and 58 are canceled herein without prejudice. Claims 1-5, 12-15, 31, 42, 44, 46, 48, 50, 52, 54, 56, 62 and 63 are amended herein to more particularly define the invention. Support for these claim amendments is found throughout the specification as set forth below and in the original claim language. It is believed that no new matter is added by these amendments and their entry is respectfully requested. In light of these amendments and the following remarks, applicants respectfully request reconsideration of the pending application and allowance of the pending claims to issue.

Applicants wish to thank Examiner Mehta for the opportunity to conduct a personal interview for this application on September 9, 2003, at which applicant's representative, Dr. Mary Miller, and co-inventor, Dr. Dominique Robertson, were présent. The pending rejections and cited art were discussed and the present amendments and remarks are presented herein in response to those discussions and to address other issues raised in the Office Action that were not discussed in the interview.

### **I. Provisional double patenting rejections**

A. Claims 1-41 and 58 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1, 2, 5-13, 16, 17, 20-42 and 44-56 of copending application serial no. 09/876.360.

B. Claims 1, 3, 4, 6, 11, 31, 32, 38, 39, 50, 51, 54, 55 and 58 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1, 2, 5, 13-16, 18-21, 23-31, 34, 36, 40, 41, 43-46 and 50 of copending application serial no. 09/876.503.

C. Claims 1, 2, 4-16, 21, 31, 32, 38-58, 62 and 63 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly unpatentable over claims 1-8, 11, 12, 17, 18, 20-24, 27-29, 33-74 and 84-92 of copending application serial no. 09/560,111.

As the Examiner has noted, these are all provisional rejections, based on the fact that no claims have been allowed in any of these applications. If claims issue in any of the above-referenced patent applications prior to the issuance of claims in the present application, applicants will provide a Terminal Disclaimer, if necessary, at that time. Thus, because these rejections are only provisional, applicants respectfully request their withdrawal and allowance of the pending claims to issue.

## **II. Rejection under 35 U.S.C. § 112, second paragraph**

A. The use of the term "vector" in claims 1, 12, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 62 and 64.

The term "vector" as recited in the claims and throughout applicants' specification is clear and definite in its meaning and it would be readily apparent to one of ordinary skill in the art that the silencing vector of the present invention can be a single vector, as that phrase is understood. In particular, it is pointed out throughout the specification that the silencing vector described therein can be a single construct as recited, for example, on page 8, lines 8-11 (describing that the present invention demonstrates the ability to silence endogenous gene expression systemically in a plant using a plant virus construct); on page 9, lines 13-17 and on page 10, lines 14-16 (describing monopartite geminiviruses, which have a single genomic component, as included among the geminiviruses of this invention); on page 17, lines 19-27, as well as in claims 33, 39, 52 and 90 (describing a single vector comprising, at a minimum, an origin of replication, DNA encoding proteins necessary for replication and heterologous DNA); on page 13, lines 16-20 (wherein the term "DNA silencing vector" is defined to be a DNA construct capable of replicating within a host cell and carrying a heterologous DNA sequence that is similar or identical to an endogenous plant gene or gene fragment); on page 16, lines 23-31 (describing transfecting a plant with an altered DNA A

component simultaneously with the DNA B component or with a binary plasmid comprising the combination of A and B components and also describing transfection of plant cells with a recombinant geminivirus transfer vector, which when used in an embodiment wherein both the A and B components are used, each component can be introduced into a plant cell separately or together on a single DNA construct); and on page 21, lines 12-14 (describing a preferred embodiment wherein plants are inoculated with microprojectiles carrying a geminivirus construct that includes both the A and B DNA components).

Furthermore, Example 3 describes that bombardment of plants with the TGMV-A construct alone resulted in silencing that was not observed to be systemic and that systemic silencing occurred when plants were bombarded with the TGMV-A construct in combination with the TGMV-B construct (page 35, lines 19-22).

Thus, it is clear that the specification describes the silencing vector of this invention as a single vector. As noted in the specification and in some of the Examples therein, in some embodiments, the silencing vector can be introduced into a plant in combination with a separate DNA-B component if systemic silencing is desired. However, as demonstrated herein, in other embodiments, systemic silencing, if desired, can be achieved by including the necessary proteins encoded on the DNA-B component in a single silencing vector that also comprises the other elements necessary to achieve silencing.

It is also apparent from the teachings of the specification that silencing can be achieved without proteins from the DNA-B component. For example, the specification states on page 17, lines 28-31, that "[e]pisomal silencing constructs that utilize portions of DNA plant virus genomes do not have to include the viral movement proteins to accomplish gene silencing. The present inventors have determined that the viral movement proteins are non-essential for episomally-mediated gene silencing."

Thus, in some embodiments of the present invention, the DNA-B component or the coding sequences for the movement proteins can be included as a separate plasmid or included on a vector with the silencing vector and in other embodiments, the DNA-B

component or coding sequences for the movement proteins need not be present at all in order to carry out the silencing methods of the claimed invention.

For the reasons set forth above and as acknowledged by the Examiner at the September 9, 2003 interview, applicants assert that the term "silencing vector" as presented in the claimed invention is clear and definite in its meaning and that this rejection has therefore been mooted and applicants respectfully request its withdrawal.

B. The use of the phrase "a promoter associated with said endogenous plant gene" in claim 4.

Claim 4 is amended herein to recite a promoter operably linked with said endogenous plant gene, as proposed by the Examiner at the September 9, 2003 interview. Thus, applicants believe this rejection has been overcome and its withdrawal is respectfully requested.

C. The use of the term "modifies" in claims 11, 21 and 58.

Claims 11, 21 and 58 are canceled herein, thereby mooting this rejection and applicants respectfully request its withdrawal.

### **III. Rejection under 35 U.S.C. § 112, first paragraph**

Claims 1, 2, 4-6, 11-16, 21, 31, 32, 38-58 and 62-65 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor, at the time the application was filed, had possession of the claimed invention.

As discussed during the personal interview on October 16, 2002 with Examiners Kaushal and Priebe and during the personal interview on September 9, 2003 with Examiner Mehta, as well as on the basis of arguments previously submitted, applicants believe that the specification as filed provides adequate written

description of the claimed invention. It is applicants' understanding that this has been acknowledged by all of these examiners for the reasons discussed at the respective interviews and presented in previous responses. Therefore, applicants believe this rejection has been overcome and its withdrawal and allowance of the pending claims to issue is respectfully requested.

#### **IV. Rejection under 35 U.S.C. § 112, first paragraph**

Claims 1, 2, 4-6, 11-16, 21, 31, 32, 38-58 and 62-65 are rejected under 35 U.S.C. § 112, first paragraph, as allegedly being enabling only for geminivirus silencing vectors comprising fragments that are at least 403 bp in size and from coding sequences.

Applicants respectfully traverse this rejection and assert that the invention as claimed is adequately enabled for the full scope of the pending claims. Specifically, as discussed at the personal interview with Examiners Kaushal and Priebe on October 16, 2002 and with Examiner Mehta on September 9, 2003, applicants have demonstrated that the claimed silencing vectors function as claimed in studies employing a variety of geminivirus genomes, a variety of heterologous DNA sequences and a variety of plants. Also provided are data demonstrating that silencing can be achieved at both the pre- and post-transcriptional levels. Applicants provide herewith evidence of two different geminivirus vectors, 17 different heterologous DNA sequences and species from two different plant families in which the claimed invention has been demonstrated to function as described, in the form of a Declaration of Dr. Dominique Robertson under 37 C.F.R. § 1.132, a copy of which is attached hereto.

Although it is applicants' belief that the claims as written are adequately enabled over the full scope of the invention, to address any concerns that Examiner may have regarding the term "fragment," pending claims reciting this term are amended herein to recite that the fragment is of a size sufficient to induce silencing. Support for this amendment can be found throughout the specification and at least on

page 14, lines 2-3. This amendment is provided merely for clarity to more particularly define the invention and is not a narrowing amendment.

For the reasons provided above, applicants believe that the invention is fully enabled commensurate with the claims and respectfully request that this rejection be withdrawn.

**V. Rejection under 35 U.S.C. § 102(b)**

Claims 42 and 46 are rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Hayes et al.

Claims 42 and 46 are amended herein in accordance with discussions with Examiner Mehta at the September 9, 2003 interview. These amended claims are not anticipated by Hayes et al. and it is respectfully requested that this rejection be withdrawn.

**VI. Rejection under 35 U.S.C. § 103**

Claims 1, 2, 4-6, 11-16, 21, 31, 32, 38-58 and 62-65 are rejected under 35 U.S.C. § 103 as allegedly obvious in view of Hayes et al. in combination with Metzlaff et al., Theologis et al., Meyer et al. and Koes et al.

Claims 6, 11, 16, 21, 38-41 and 58 are canceled herein without prejudice, thereby mooting this rejection as it pertains to these claims.


Claims 1-5, 12-15, 42, 44, 46, 48, 50, 52, 54, 56, 62 and 63 are amended herein in accordance with discussions with Examiner Mehta at the September 9, 2003 interview. These amended claims were not obvious at the time this invention was made in view of the cited references, either alone or in any combination. In particular, none of the cited references teach or suggest the claimed geminivirus silencing vectors or the use of the geminiviruses of this invention in the claimed

methods. Furthermore, there is nothing in the cited art that would have led one of ordinary skill in the art, at the time this invention was made, to expect that the degree of silencing effect achieved by the vectors of this invention could allow them to be distinguishable from any other vector used to induce silencing, as has been shown in the present invention. Therefore, the present invention was unexpected and unobvious and thus overcomes this rejection. Applicants respectfully request its withdrawal and allowance of the pending claims to issue.

The Examiner is encouraged to contact the undersigned directly if such contact will expedite the examination and allowance of the pending claims.

No fee is believed due. However, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-0220.

Respectfully submitted,



Mary L. Miller  
Registration No. 39,303

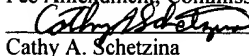
**USPTO Customer No. 20792**  
Myers Bigel Sibley & Sajovec  
Post Office Box 37428  
Raleigh, North Carolina 27627  
Telephone: 919/854-1400  
Facsimile: 919/854-1401

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Cathy A. Schetzina